ARGUMENTS/COMMENTS

Claims 1, 3, 9, 14 and 59 through 70 are pending in the present application. Claims 2, 5, 6 and 62 have been canceled. Claims 59, 60, and 63 through 66 remain withdrawn in the present application as being drawn to a non-elected species.

Applicants sincerely appreciate the many courtesies that were extended by Primary Examiner Flanigan during the interview on December 16, 2009 with Mr. Peter Bawden and Mr. Paul Greeley, representative of the Applicants. Applicants have incorporated the suggestions provided during the interview to advance prosecution of the present application.

In the Office Action, claims 2 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Further, the Office Action indicates that claim 2 attempts to limit the residence time of the fluid in terms of the length of the length of the "heat transfer surface". Claim 2 has been canceled in the present amendment. Rejections with regard to dependent claim 2, are rendered moot by the present amendment.

In the Office Action, claims 1 through 3, 5, 6, 9, 14, 61 and 62 were rejected under 35 U.S.C. 103(b) a being anticipated by Japanese Patent No. JP410274837A to Watabe et al. in view of U.S. Patent No. 5,667,758 to Matsugi et al. Applicants note that claims 2, 5, 6, and 62 have been canceled by the present amendment and rejections with respect to these claims are rendered moot.

Independent claim 1 is directed to a heat exchanger to control the temperature of a process fluid in a reaction system. Claim 1 provides for, in pertinent part,

"a reaction vessel containing the process fluid"

"a plurality of circumferential heat transfer conduits around the circumference of said reaction vessel to provide a heat transfer surface between the heat transfer conduits and the reaction vessel",

"wherein each of said plurality of heat transfer conduits is separately supplied with heat transfer fluid",

"wherein said plurality of heat transfer conduits number from 10 to 200 and carry a flowing heat transfer fluid" and

"wherein each of said 10 to 200 heat transfer conduits extends around the circumference of the reaction vessel".

Both Watabe and Matsugi are concerned with the temperature control of reactors. Watabe discloses passing a temperature control fluid through a *single* discrete *helical* flow path in which the cross sectional area of the path is reduced along the helix so that the flow velocity of the temperature control fluid increases as it passes through the helix. Significantly, the coil of Watabe is a single coil, not a plurality of circumferential heat transfer conduits that are each separately supplied. Further, Watabe discloses a coil having a helical flow path and not a circumferential flow path.

Matsugi is principally concerned with equilibrating the pressures in a system and provides an inner reactor body (6) to the outside of which is fitted a passage for the flow of temperature control fluid. This inner reactor body with the fitted passage is then mounted in a vessel body in such a way that a spacing is provided between the exterior of the passage and the inner surface of the vessel body. The spacing is a closed chamber and is used to provide a pressure balancing system between the chamber and the vessel body (column 2 lines 45 to 62). In operation the pressure balancing system ensures that equal pressure is applied to the two surfaces of the temperature control element. The pressure balancing system reduces stress on the control element and allows thinner materials to be used and thus improve the efficiency of heat exchange.

Matsugi first discloses a reactor with a *single discrete helical flow path* and goes on to say that a plurality of annular flow passages formed helically may be provided (column 3 lines 29 to 31). Matsugi suggests that two or three such helical passages may be provided so that the length of the flow passages may be reduced to reduce the time the temperature control medium stays in the passage to improve heat exchange efficiency and reduce pressure loss so that the circulating pressure can be reduced.

Matsugi states that "If the sectional areas of the flow passages are equal to each other the total flow passage sectional area is multiplied by the number of the separated flow passages".

Figure 3 of Matsugi shows two flow passages 9_1, and 9_2 that both provide zigzagged flow paths up and down the sides of the reactor. Figures 4 and 5 show variations and in every instance each flow passage is in contact with the entire height of the reactor. It is clear from the passage at column 5 line 61 that the flow passages have a top-bottom relationship with each passage being fed or emptied from the top and emptied or fed from the bottom. Matsugi states at column 8 line 37 to 40 that

"If plural flow passages are formed the total flow passage sectional area can be increased substantially largely and the flow passage length can be reduced".

Both Watabe and Matsugi therefore employ helical passageways extending over the entire outer surface of the reaction vessel in contrast to the circumferential conduits required by independent claim 1. Watabe shows the passageways extending 5 times around the reaction vessel and Matsugi appears to show 15 times in Figure 1 and 9 times in Figures 4 and 5.

Accordingly replacing the single helical passage in Watabe with two, three or any desired number of parallel helically extending passages would not

result in a system in which each conduit extends around the circumference of the vessel and has a length of at most twice the circumference of the vessel as is required by the applicants claim.

Independent claim 1 requires:

i) a high number of conduits; and
ii) that each of the conduits be supplied separately.

New claim 67, requires that each of the conduits has a valve attached thereto to control the flow of heat transfer fluid entering and exiting the conduit.

New claim 68 requires that each of the plurality of conduits has a separate inlet and a separate outlet.

New claim 69 requires that each conduit has a length of at most twice the circumference of the vessel and has a cross-sectional area of less than 500 square millimeters.

Claim 70 requires that the heat transfer conduits contain an even distribution of heat transfer fluid.

The combination of Watabe in view of Matsugi also do not provide for these limitations either alone or in combination.

The claimed system provides for a small amount of heat transfer fluid travelling a short distance that can achieve accurate temperature control.

The system does not include discrete side by side helical flow paths as suggested by the Examiner the system comprises discrete circumferential flow paths which is not derived from a combination of Watabe and Matsugi.

Reconsideration and withdrawal of the 35 U.S.C. 103(a) rejection are respectfully requested.

In view of the above, it is respectfully requested that the present application is in condition for allowance. Favorable consideration of the present application is respectfully requested.

Consideration and allowance of application is respectfully requested.

Respectfully submitted,

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